

NOTES ON FRUIT-FLIES (*TRYPETIDÆ*) WITH
DESCRIPTIONS OF NEW SPECIES.

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Since the distribution of my Report dealing with these pests (Official Report, 1907-8; Fruit-Flies), I have received a great many letters, and specimens from different parts of the world, where fruit-flies are found; and I have thus obtained a great deal of interesting material to examine for my correspondents.

I am indebted to Mr. C. C. Gowdey, for a fine series of *Ceratitis punctata* from Entebbe, Uganda, where it is a pest upon cocoa. Mr. Dupont, Curator of the Botanic Gardens at Mahi, Seychelles, has sent me *Ceratitis catoirei* bred from oranges. Mr. J. J. Fletcher has obtained a new and very handsome species of *Ceratitis* from the fruits of a West Australian Loranthus. Mr. P. Keenig, Director of Forests and Gardens at St. Louis, Mauritius, sent me a series of *Dacus sigmoides*, the common pest of melons. Mr. H. H. King, of the Gordon College, Khartoum, has sent me several new species from Egypt; and Dr. Roepke others from Java. During my visit to the Solomon Islands, last year, I captured a number of specimens of a species of *Dacus*, identified by Mr. Coquillet as *D. zonatus* Saund., and other specimens of this species were given to me, from Murray Island. I am indebted to Professor Bezzi, of Turin, and to Mr. D. W. Coquillet, of Washington, for the determination of several of my specimens; and to the former, and to Mr. P. L. Lounsbury, of Cape Town, S. Africa, for named specimens. Mr. T. Kirk, of New Zealand, has also sent me some curious forms, obtained from fruit imported from the Pacific Islands.

CERATITIS LORANTHI, n.sp. **A Mistletoe Fruit-Fly.**

Length 6 mm. from front of head to tips of wings. General form and size of *C. capitata*; but the greyish markings on the dorsal surface of the thorax more regularly enclosed in black, the central black blotch and club-shaped markings on either side running up into the greyish area, where they are clearly defined, forming with the scutellum three regular bands.

Basal portion of the wings as in *C. capitata*, but without any yellow or ochreous clouding; the apical two-thirds cut off from the basal area of the wings, with a broad fuscous band which merges into a uniform stripe along the costal margin, from which a second transverse stripe emerges, crossing to the hind edge; beyond this a short finger-like bar turns downward, while the costal stripe extends round the tip of the wings.

Chaetotactic characters.—Head: antennæ covered with fine spines; arista long; front with four bristles on either side, a bristle springing out on either side of the lower ocellus; two stout bristles on either side of the vertex, with two stout bristles between them behind the ocelli; a fringe of short spines round the hind margin of the eyes. Thorax: four small bristles on the front margin, five on either side, eight on the dorsal surface, and four on the scutellum.

Hab.—Perth, W. Australia. Bred from fruits of *Loranthus pendulus* on *Eucalyptus* sp. (J. J. Fletcher).

The fruits of the *Loranthus* were sent to Mr. Fletcher by Dr. J. Burton Cleland, at that time resident in Perth, as botanical specimens; on examination they were found to be badly infested with fly-maggots; Mr. Fletcher, therefore, kept them under observation, and when they bred out, handed the flies to me for identification. The distinct banding of the wings is quite unlike any other described species of the genus.

CERATITIS PUNCTATA Wiedm. **The Cocoa Fruit-Fly.**

This large, handsome fly was described by Wiedemann from Ashanti, West Africa, in 1824; but was rare and comparatively

unknown in collections until now. Last year(1909), Mr. C. C. Gowdey found this fly doing a great deal of damage to the Cocoa pods, in the plantations at Uganda, and he sent a fine series of specimens to Mr. Austen, at the British Museum, and also to me; we both identified it as Wiedemann's long-lost species. Gowdey has published a leaflet on the cocoa-fly, giving an account of the damage it causes, and its life-history; but he does not give a description of the adult fly.

This is one of the largest species of the genus, measuring up to $\frac{2}{5}$ inch from the front of the head to the tips of the wings. General colour dull greyish-brown; spotted all over the dorsal surface and abdominal segments with dark brown to black marks, those upon the thorax small, except the three large, shining, black blotches occupying the scutellum. Wings mottled and barred much like those of *C. rubivora*.

Chaetotactic characters.—First antennal joint with a fan of fine bristles; face covered with fine scattered bristles, but without large lateral bristles; hind margin of eyes fringed with stouter bristles, eight or more in number. Thorax: each black spot bearing a stout bristle; front margin of thorax with six, two outer ones longest; no bristles on the rounded scutellum. The whole of the dorsal surface of the abdomen clothed with fine bristles, forming a transverse band round each segment, to the sheath of the ovipositor of the female.

Hab.—Uganda, E. Africa; attacking Cocoa-pods (Mr. C. C. Gowdey).

CERATITIS CATOIREI Guérin. The Mauritius Fruit-Fly.

From the Seychelles Islands, I have a female specimen of a *Ceratitis* which was obtained by Mr. Dupont, Director of the Botanical Station at North Mahi, from a Tangerine orange.

It agrees in colouration and size with Guérin's description of *C. catoirei*, which was described from Mauritius as damaging oranges.

Chaetotactic characters identical with those of *C. capitata*. Head: four bristles on either side of front, one on

either side of the lower ocellus, two on each side of the vertex behind the angle of the eye, with a fine fringe of bristles round the hind margin of the eyes. Thorax: five on each side of the thorax, a row of three on either side of the dorsal surface, with four in the centre, the lower pair reaching over the scutellum, which is furnished with four long bristles.

DACUS TRYONI Frogg. The Queensland Fruit-Fly.

Some interesting points have been worked out in the life-history of this species, through the experimental work carried out by Mr. W. B. Gurney at Narara. While non-existent, last season, in the orchard-fruits, a great number of the indigenous, succulent-fruited scrub-trees, such as the Black Apple (*Sideroxylon (Achras) australe*), the Cheesewood (*Acronychia laevis*), and the White Ash (*Schizomeria ovata*) were found to have their fruits badly infested with the larvæ of this fruit-fly. These trees were often growing in belts of scrub along the gullies adjacent to the orchards, yet the fruit-flies did not spread away from the indigenous fruits. This tends to show that this fruit-fly is a native of the coastal districts of New South Wales as well as Queensland, ranging as far south as Gosford, fifty miles north of Sydney; but it is confined to the rich brush-lands upon which these succulent-fruited, forest-trees and shrubs grow.

A small, red, braconid parasite, closely allied to a braconid wasp (*Cratospila rudibunda*), the parasite of the Mexican fruit-fly, *Trypeta ludens*, has been bred from the fly-larvæ infesting these wild fruits: and, as might be expected, the smaller fruits have yielded the larger per centage of parasites. In the case of the small White Ash berries, 50 per cent. of the fly-pupæ collected contained parasites. Though there appears to be little hope that these parasites will be of any commercial value in destroying the Mediterranean fruit-fly, in such fruits as oranges and peaches, it may be valuable in dealing with the olive-fly of Italy; and we propose, this coming season, to ship quantities to that country, for experiments in this direction.

DACUS CUCUMIS French.

Journ. Agric. Victoria, May, 1907.

French proposed this, as a varietal name of a fly, bred from cucumbers imported into Victoria from North Queensland. I submitted this with other species to Dr. Bezzi, of Turin, and Mr. Coquillet, of Washington, who both consider it to be a good species.

This last year, a large number of specimens were obtained from shipments of cucumbers condemned at the port of Sydney, which had been grown in Mackay, Queensland. The distinctive characters in which it differs from *Dacus tryoni* are, a somewhat uniform lighter colour; a short yellow dorsal stripe down the centre of the apical half of the thorax, but not reaching to the basal margin of the scutellum; and four bristles on the apical margin of the scutellum.

In *Dacus tryoni* there is a row of four bristles along the apical margin of the thorax, behind the scutellum, and only two bristles on the apical margin of the scutellum.

DACUS FRENCHI Frogg.

This species was described from a specimen obtained from Mr. C. French, Government Entomologist of Victoria, who bred it from oranges, from New Caledonia.

Among some fruit-flies sent to me by Dr. Roepke, of Java, were four male specimens of an undetermined species, that proved, on careful comparison with the type, to be the other sex of this species (the type being a female). The only difference is in the shape of the abdomen, which is elongate and somewhat spindle-shaped in the male.

This fly, therefore, must have a very wide range, if found in New Caledonia and Java. Dr. Roepke's specimens were bred from the fruits of *Artocarpus integrifolia*.

DACUS KINGII, n.sp.

♂. Length, 8 mm.; ♀. 11 mm. to tip of ovipositor. More slender in form than usual; thorax narrow, truncate in front, broadest

across the base of wings; wings hyaline, with a faint blotch of fuscous at tips. Abdomen somewhat cylindrical, rounded at apex; that of the ♀ furnished with a slender tubular ovipositor, projecting beyond, and as long as the abdomen. Dorsal surface of thorax clothed with long silvery pubescence, that on the abdomen golden.

Head yellow; eyes chestnut; two black spots below the antennæ, four on front between the eyes and the blotch round the ocelli black. Thorax dark reddish-brown, the pubescence giving it a greyish tint; humeri, a lateral stripe on the pleura, meeting the slender wedge-shaped stripe, coming up the median suture, well into the dorsal surface, a double rounded blotch on the hypopleura, a short wedge-shaped stripe in the centre of back in line with centre of the scutellum, pale yellow. Legs yellow, with the exception of a broad band of reddish-brown on the apical half of the femora. Abdomen light reddish-brown; lightly clothed with golden pubescence, and banded with pale yellow.

Chaetotactic characters.—Two pairs of bristles on front between the eyes, a large one on either side of the vertex, with a smaller one on either side behind the eyes. Thorax with short bristles on the front margin, and on either side; scutellum carrying a pair.

Hab.—Khartoum, Egypt (Mr. H. H. King, Entomologist, Wellcome Research Laboratories, Gordon College). Bred from the fruits of the Usher-tree (*Calatropis procera*).

DACUS SIGMOIDES Coqu.

This species was described by Coquillet, from one female specimen, from Mauritius.

Mr. P. Keenig, Director of the Botanical Station at Mauritius, sent me four specimens of a fruit-fly, very destructive to melons; this agrees with Coquillet's description.

These specimens vary much in size, and in the black and yellow markings on the dorsal surface of the thorax; one has the short yellow stripe between the two black bars; others have the

yellow dorsal stripe wanting; and, in another, the black bars are hardly outlined on the thorax.

DACUS ZONATUS Saunders.

Dasyneura zonata Saund., Trans. Ent. Soc. iii. pl.v., f.3, 1841.

Length 10 mm.

Head ochreous; eyes chestnut; antennæ large, apical joint brown; arista long and slender; two black spots below the antennæ, with blotch above, three spots on either side of the front, and a central blotch encircling the ocelli clouding the vertex. Thorax black, clothed with fine silvery pubescence; on either side of the dorsal surface a short elongate yellow stripe, broadest in front and tapering to a point behind; humeri large; a nude area on mesopleura, with a wedge-shaped one above not reaching the dorsal surface of the median suture; a double rounded blotch on hypopleura; scutellum bright yellow. Legs yellow, tibiæ of hind pair clouded with brown. Wings hyaline; with the costal margin and stripe across the basal portion brown. Abdomen ochreous, with golden pubescence; basal segment, a broad marginal band on 3rd-5th segments, and a slender dorsal stripe from base of 2nd segment reaching to the tip of the abdomen, black.

Chætotactic characters.—Head: each of the six frontal spots bearing a black bristle, four on the vertex, and a fringe of small ones behind the eyes. Thorax: four bristles on the front margin, central ones smallest, six on either side, and two on hind margin of scutellum.

Hab.—Bainka, Russell Group, Solomon Islands (Messrs. McKenzie and Froggatt); Ceylon and India (in mango gardens); Murray Island.

About thirty specimens, all males, were taken in an open glade in the forest, by sprinkling the foliage with a citronella oil mixture; until the oil was used, no specimens were seen. One female specimen was taken with a sweeping net, on the edge of the forest; it differs from the male in having darker-coloured legs, and in the whole of the abdomen, with the exception of the basal reddish band, being black.

In a paper entitled "Four new Dipterous Insects from Central and Northern India," Saunders proposed the genus *Dasyneura* for the reception of this fruit-fly. I am indebted to Mr. Coquillet for identifying my species from the Solomon Islands, as the one found in Central India, so many years ago.

It is very variable in the colouration of the abdomen, but the dorsal stripe on the lower half of the abdomen is constant, if at times indistinct. Saunders describes the general colour as "reddish-brown," but the dorsal surface of the thorax of all my specimens from India, Ceylon, and the Solomon Islands, is decidedly black, with silvery pubescence.

DACUS PEPISALÆ, n.sp.

♂. Length 12 mm.

Head ochreous; eyes dark reddish-brown; antennæ mottled with black; arista black; two large spots below the antennæ, a blotch on the front above, which envelops the first pair of lateral spots, two spots on either side above, and the area round the ocelli, black. Thorax black, with an indistinct pattern of silvery pubescence on the dorsal surface; humeri small, yellow, in contact with upper edge of nude area on mesopleura, which extends to the base of the middle trochanters; a small wedge-shaped nude yellow area in the median suture on either side joins a dorsal stripe on the sides of the mesothorax, which does not reach the hind margin; a double oval patch on either side of the hypopleura bright yellow; scutellum ochreous; truncate at apical margin. Legs yellow, mottled with brown. Wings large, clouded so thickly with yellowish-brown that only the first basal cell, a transverse stripe behind it, the centre of the first posterior and the anal cell are transparent. Abdomen ochreous, covered with fine golden pubescence; the whole of the first segment, a fine broken band across the second, and the outer third of the sides of the third and fourth with a fine central stripe, and the whole of the anal segment, black.

Chaetotactic characters.—The dark reddish-black blotch on the front above the antennæ is convex, and covered

with short black bristles, with three pairs of lateral bristles on the front and two above the ocelli on either side. Thorax: no bristles on the front margin, but a tuft of fine hairs on each shoulder; lateral bristles five in number, and two scutellar bristles.

Hab.—Russell Group, Solomon Islands; one male, caught with a sweeping net, on the edge of the forest (W. W. Froggatt).

DACUS PASSIFLORÆ, n.sp.

Length 9 mm.

Head dull yellow; mouth-parts and antennæ darker, terminal joint of latter large; arista long, slender; eyes dark red; a lunate dark blotch above the antennæ, front unspotted, dull brown; ocelli enclosed in an angular black blotch. Thorax black, no yellow on shoulders, the large angular nude area on mesopleura not reaching the dorsal edge, yellow; scutellum narrow, convex, dull yellow; double yellow spots forming a blotch on hypopleura. Wings hyaline, nervures chocolate-brown. Legs light yellow, sometimes clouded at the apex of the femora, tibiæ, and tarsi. Abdomen black, elongate, oval; in the female the basal segment is broadly rounded, with the anal segments and ovipositor turned down right under the basal portion; sheath of ovipositor large, apex yellow.

Chaetotactic characters.—Head: three pairs of bristles on the front, the first pair longest, crossing each other at the tips; the third pair below the ocelli shorter; apex with a pair of stout bristles on either side. Thorax: bristles on front margin short, four on either side, with a pair on the dorsal surface above the scutellum, the latter furnished with a pair on the hind margin.

Hab.—Fiji (W. W. Froggatt; bred from Granadilla-fruits); (A. Koebele; bred from mangoes); (T. Kirk; from fruit imported into New Zealand).

DACUS TONGENSIS, n.sp.

Length 9 mm., across outspread wings $12\frac{1}{2}$ mm.

Head ferruginous; eyes reddish-chestnut; apical joint of antennæ fuscous; two black spots below antennæ, a blotch round

their base and back of head, black. Thorax: dorsal surface black; with silvery pubescence forming indistinct bands; humeri small, well down the sides; nude area on mesopleura forming a narrow stripe not extending to the dorsal surface; two rounded spots on hypopleura, and the narrow convex scutellum yellow; apical portion behind the scutellum forming a distinct, black, square patch marked off by the scutellum above, and the yellow blotches on either side. Wings hyaline, nervures brown. Legs straw-yellow, darkest at junction of femora and tibiæ. Abdomen of male spindle-shaped, broadest in the centre, tapering to apex; of female much broader, anal segment narrow truncate, with the sheath and ovipositor reddish. General colour ochreous, mottled with black, forming an irregular dorsal stripe, with a lateral one on either side, and the extremity black.

Chaetotactic characters as in *Dacus passifloræ*.

Hab.—Tonga (T. Kirk; bred from mangoes imported into New Zealand).

DACUS KIRKI, n sp.

Length 8 mm.

Head reddish-brown; two large black spots below the antennæ, spots on front very slight, hardly showing; a small blotch enclosing the ocelli and back of head blackish, terminal joint of antennæ fuscous. Thorax black, shaded with silvery pubescence, forming a broad well developed dorsal stripe in the centre, with the sides irregularly frosted; humeri well down the sides, small, and almost oval; nude area on the mesopleura forming a stripe on the side, not reaching above the insertion of the wings, yellow; scutellum angular, black on the upper surface, with the extreme margins and undersurface yellow, joining a broad yellow stripe on either side of the hypopleura. Wings hyaline, nervures brown. Legs pale yellow, mottled with brown, femora reddish-brown, tibiæ darker. Abdomen elongate-oval or heart-shaped, black, with two parallel yellow stripes separated from each other by a narrow black dorsal stripe running down to the tip; ovipositor small, undersurface yellow.

Chaetotactic characters as in *Dacus passifloræ*, except that there are four bristles on the hind margin of the thorax, two behind the scutellum and one on either side.

Hab.—(?) Bred from Island fruit imported into New Zealand (T. Kirk); bred also from peaches.

DACUS RAROTONGÆ, n.sp.

Length 9 mm.

Head ochreous, blotch round the ocelli and back of head black, eyes dark brown. Thorax shining black; humeri small, nude area on mesopleura large and angular, with a rounded blotch on each side of the hypopleura pale yellow; scutellum black. Wings hyaline, nervures light brown, slightly fuscous on the costal edge. Legs fuscous, hind pair almost black. Abdomen of male oval, pointed at apex; of female almost diamond-shaped, angular on the sides, sloping down from the middle to the small truncate apex; anal segment and ovipositor yellow. Dorsal surface of thorax and abdomen covered with fine scattered grey pubescence.

Chaetotactic characters.—Head similar to that of *D. passifloræ*, with the addition of a pair of short bristles on the sides of the lower ocellus. Thorax with two bristles on either side of front margin; five on either side above scutellum, two short bristles with a longer one on either side; scutellum with a pair of long bristles.

Hab.—Rarotonga [Cook Islands] (T. Kirk; bred from mangoes).

RIOXA (TRYPETA) MUSÆ Floggatt.

Professor Bezzi, to whom I sent specimens of this and other Australian fruit-flies, informs me that this species, which I referred to the genus *Trypeta* in my original description, should be assigned to *Rioxa*, which contains about half-a-dozen species, confined to the Malay Islands. He says of it: "A distinct form from all the other species of *Rioxa*, distinguished by the wholly black stigma on the wings."